Weismann retains the original conception. But the germ-plasm is now a particulate substance, and *inequalities of nutrition affecting the separate elements cause variations in it*. The original conception has now become more definite, and this increase in definition has effected a reconciliation with some strong objections to the generalised idea. It seems to me extraordinary that a critic so acute as Dr. Romanes, not in the heat of controversy but in a deliberate book, should call this "removing stone by stone, his doctrine of descent," and "turning upside down the fundamental postulate." In order to reach such a view he has had to be much more certain than Weismann, about what Weismann meant, and to attribute to "mere carelessness" the inclusion in Weismann's earlier writings of indications pointing in this direction.

In Appendix I. the germ-plasm is discussed specially in so far as Weismann considers pangenesis a less conceivable and a more formal explanation. I think the key to the criticism is again to be found in a misconception by Dr. Romanes. He quotes from Weismann:—

> "How can such a process (*i.e.* the passage of gemmules into growing germ-cells) be conceivable when the colony becomes more complex, when the number of somatic cells becomes so large that they surround the reproductive cells with many layers, and when, at the same time, by an increasing division of labour, a great number of different tissues and cells are produced, all of which must originate *de novo* from a single reproductive cell?"

He goes on:—

> "Here again the obvious answer is that no one has ever propounded such a statement. Far from supposing that 'all the different cells and tissues of a complex organism must originate *de novo* from a *single* reproductive cell,' the theory of pangenesis supposes the very contrary—viz. that somatic changes in the past history of the phyla had *not* thus originated in *any* reproductive cell. The idea of somatic changes originating in reproductive cells belongs to the theory of *germ-plasm*; but even this theory does not suppose all the great number of different cells and tissues which compose a complex organism to have ever originated *de novo* from a *single* reproductive cell."

What Weismann means seems clear enough, although it is dark to Dr. Romanes. The whole of a complex organism grows out from an ovum, and this origin occurs *de novo* in each generation. Pangenesis supposes that gemmules from each cell in the body somehow come together to form the ovum, and they come together so that they unroll in proper order. For this process there is no trace or shadow of evidence: to many it seems *à priori* inconceivable.

According to Weismann's theory the germ-plasm has been slowly built up in phylogeny, and slowly unrolls in the individual development. On any supposition the process is wonderful: on Weismann's hypothesis the evolution of germ-plasm has actually followed the evolution of living things from simple to complex, and there is no new wonder in its complexity, nor is the unrolling of the historically elaborated germ-plasm more wonderful than the actual development of the historically elaborated soma. The hypothesis of pangenesis supposes that in each living organism there is a new wonder, the giving off of gemmules, and their building up into an ovum which reproduces not only the structures which gave off gemmules, but many an embryonic structure dating far back in phylogenetic history.

Appendix II. deals with Telegony, and practically consists of Dr. Romanes' recent controversy with Herbert Spencer. In the mass of confused data about this subject it seems fairly established that at least it is very rare. The influence of a first sire does not as a rule affect children to a second sire. Herbert Spencer thinks that the established cases are fatal to Weismann's theory, inasmuch as they prove that influences impressed on the soma can be transferred to the offspring. Romanes thinks that they are not fatal, inasmuch as germ-plasm from spermatozoa of the first sire coming in contact with the ovary when a spermatozoon caused impregnation, might, as they disintegrate, allow some of their germ-plasm to penetrate the ovary and reach other ova. The actual explanation seems, to the present writer, a much simpler one, but as he is collecting facts he will only mention it. In the best established cases, as for instance Lord Morton's mare, and the sow quoted by Mr. Spencer, the first sire was of a more ancestral type than the second sire, and the characters in the progeny attributed to the influence of the first sire were atavistic, and in ordinary cases would have been simply referred to as throw-backs. But as at present Dr. Romanes' criticism of Weismann is the matter in hand, it is enough simply to point out that in this most difficult case for followers of Weismann, Saul also is among the prophets—Dr. Romanes agrees with Weismann!

P. C. M.

EXTRA-TROPICAL ORCHIDS.

Icones Orchidearum Austro-Africanarum Extra-tropicarum; or Figures, with Descriptions of extra-tropical South African Orchids. By Harry Bolus, F.L.S. Vol. i. Part 1. (London: William Wesley and Son.)

THIS is an excellent work, devoted to the orchids of extra-tropical South Africa, and arranged on the lines of the "Refugium Botanicum" of Mr. Wilson Saunders. The first part includes fifty plates, containing figures and dissections (partly coloured) of fifty-one species. The text comprises descriptions in Latin and English, references to original descriptions, synonymy, geographical distribution, with critical and explanatory notes. The author's many years of careful study of South African orchids, as well as his previous writings on the subject, are sufficient guarantee of the quality of the work; and as regards the plates, a decided improvement is noticeable, both in the drawings and lithography, as compared with his previous "Orchids of the Cape Peninsula" (reviewed in NATURE, vol. xxxix. p. 222). The work will be of great use to the systematic botanist, for, as Mr. Bolus has well pointed out, few orders of plants stand more in need of illustration from living specimens than orchids, because of the high degree of specialisation of many of the parts, some of which are very fleshy, and seldom recover their shape after soaking or boiling. Nine new species are described in the present part, *Angræcum caffrum*, *A. Maudæ*, *Habenaria Galpini*, *Satyrium Guthriei*, *S. ocellatum*, *Pachites Bodkini*, *Disa sabulosa*, *D. conferta*, and *Brown*

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leea Galpini. There are strong grounds, however, for suspecting that *Satyrium Guthriei* is not a true species, but a natural hybrid. It was described from a single living specimen found growing with *S. candidum*, Lindl., in burnt-off places on the Cape Flats, Tokai, near Cape Town, by Mr. F. Guthrie. Mr. Bolus remarks that the column "resembles in some degree that of *Satyrium bicallosum*, Thunb., while both are in this respect very different from that of any other Satyrium known. In every other character this differs greatly from *S. bicallosum*, and I very much doubt if it is a natural hybrid." This remark shows that Mr. Bolus had suspicions about the matter. It is a remarkable fact, however, that in every character in which *S. Guthriei* differs from *S. bicallosum* it approaches *S. candidum*; in fact, with the exception of the column, it bears a much closer resemblance to the last-named species, and as the organs generally are intermediate in character between those of the two species, there seems little doubt that it is a natural hybrid between them. Many such organisms are now known, and as both the species grow in the district, there is nothing improbable about the matter.

There are several points of interest about the work, one or two of which may be mentioned here. The discovery of a new species of Pachites is very interesting, as the original one has only been met with on four occasions. Burchell found a single specimen in 1815; Krausse met with another twenty-four years later; and now, after a lapse of fifty years, Mr. Schlechter has discovered two more specimens. Mr. Bolus hopes to publish a figure in the next part of his work. It is a curious coincidence that the new species is only known from a single specimen. An interesting note is given as to the affinities of Schizochilus. Sonder had indicated it as a member of the Habenarieæ, but Bentham transferred it to Diseæ. Mr. Bolus again places it near to Habenaria, and his drawings unmistakably show that this is its real position. Mr. Bolus calls attention to a very curious character found in *Satyrium pumilum*, Thunb., which Lindley referred to a separate genus. The flowers are transversely striped with brown, like a Stapelia, and to make the resemblance more complete, they also have a heavy odour of putrid flesh. As it differs so markedly from its allies in these characters, it is evident that we have here an adaptation to secure the visits of the insects which fertilise the Stapelias of the same region. And this reminds us that scarcely anything is known of the fertilisation of South African orchids. Mr. Bolus figures a beetle on the plate of *Disa elegans* (t. 35), which he found upon one of its flowers, with a pollinium attached to its thorax. It is said to be a species of Peritrichia, belonging to a group of well-known fertilisers. "This being only the second instance," remarks the author, "of an insect actually carrying orchid pollen which I have seen during many years' study of Cape orchids, I have thought it desirable to figure it with the plant." Among the undoubtedly handsome species may be noted *Disa ferruginea*, Swartz, and *D. graminifolia*, Ker. The former is noted as "abundant on Table Mountain," and its dark orange-vermilion flowers are "largely sold in bouquets in the streets." The latter was called *Herschelia graminifolia* by Lindley, though Mr. Bolus considers Herschelia as only a section of Disa. We are told that "it is one of the commonest species within our limits, has a rather long flowering period, and attracts universal observation by its beauty and brilliancy; so much so, that Lindley, in dedicating it to the great astronomer Herschel (who also was a great orchid-lover and cultivator), felicitously speaks of it as "species hæc pulcherrima *colore cœli australis* intense cæruleo superbiens!" Future parts of this useful work will be awaited with interest.

R. A. Rolfe.

OUR BOOK SHELF.

An Astronomical Glossary. By J. E. Gore. (London: Crosby Lockwood and Son, 1893.)

Fifty years ago it was the fashion to insert a glossary or dictionary of astronomical terms in every work on astronomy, but few of the books published in late years include these helpful explanations. Mr. Gore endeavours to supply the need in the volume before us. And if the science of astronomy had made no advances during the last half-century, we should have been able to give the highest commendation to his compilation. But since celestial science has had its limits considerably extended, and the old astronomy is giving place to the new, we naturally expect to find the new terms defined in a glossary which pretends to contain "an explanation of all the terms and names generally used in books on astronomy." We were greatly surprised therefore, upon looking through the book, to notice the omission of many common and important words to be found in almost every work on astronomy. Among other omissions are the words corona, prominences, chromosphere, photosphere, spectroscope, and prism. Zones are correctly described, and are exemplified by "torrid zone," "frigid zone," and "temperate zone," but the term "sun-spot zone" is unexplained. No mention is made of spectroscopic binaries, or of motion in the line of sight, or of zodiacal constellations. Stereograms are defined, but not spectrograms—that useful word coined for spectroscopic negatives. Neither meridian instrument, nor meridian circle are indexed. In fact, so many words constantly employed in astronomy at the present time are omitted, that we have come to the conclusion that Mr. Gore has only attempted to include in his glossary words used when he was a schoolboy. The tables of data merely refer to members of the solar system, and their value would be increased if the solar parallax were given which formed the basis of their computation. Lists of remarkable red stars, variable stars, and stars for which orbits have been computed, conclude the book—a book that might have been very handy to latter-day astronomers, but which in its present form is of no use whatever.

With the Woodlanders and By the Tide. By "A Son of the Marshes." Edited by J. A. Owen. (Edinburgh and London: William Blackwood and Sons, 1893.)

The author of this book is well known as a close observer of nature; and a more enthusiastic lover of natural creatures and things for their own sake it would be difficult to find. To look at flocks of bramble finches feed in some particular old beech-woods at sunrise, he trudged for five miles through snow-covered woodlands; and the book is filled with accounts of similar sights observed at all times of the day and seasons of the year. In fact, "A Son of the Marshes" is imbued with the true spirit of a naturalist—the spirit that leads men to sacrifice everything in order to obtain a clearer insight into nature.

An interesting instance of protective colouration is given on p. 163. Some broken egg-shells of the fern-owl having caught the author's eye, he looked closer into the fragments, and saw what appeared to be a short, crooked

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